to complete his investigations by a study in detail of the relation between the effects which should be observed, according to it, and the actual results of observation.

SIR WILLIAM ARROL.

SIR WILLIAM ARROL, the famous bridge-builder, born in 1839 at Houston, Renfrewshire, died on February 20 at his residence, Seafield House, Ayr. His great mechanical abilities and his remarkable administrative powers—two qualities not often found associated—enabled him in the space of little more than forty years, for he started on his own account only in 1869, to expand a humble little boiler-repairing shop into the great Dalmarnock works employing some 5000 hands.

Sir William Arrol was fortunate in finding a suitable field of work for the mental gifts with which he was so richly endowed. From the first his attention had been directed to the many novel problems, hitherto unsolved, which must be overcome if the building of long-span steel bridges was to be rendered commercially possible. It is with the great steel cantilever bridge over the Firth of Forth that his name will be for ever linked. Designed by Sir John Fowler and Sir Benjamin Baker, the hazardous and difficult task of its erection was entrusted to the firm of W. Arrol and Co. Splendid as was the design, perfect as were the working drawings down to the minutest details, when they left the hands of the two designers, it is not too much to say that it was the mechanical genius of William Arrol which made the erection of the bridge a possibility within the limits of time and cost which had been laid down by the engineers. The lengths of the spans and the height of the piers were far beyond anything previously attempted, and as a result the difficulties which had to be overcome would have daunted most men; they only served to show more clearly the extraordinary gifts he possessed. It was in this task that his mechanical genius found its best outlet. During the whole of the seven years that the work was in progress he was constantly busy, scheming new devices such as improved hydraulic riveting appliances, oil-fired rivet-heaters, complex and ingenious machines for the troublesome task of drilling the plates which went to build up the huge steel compression members, and, most important of all, no detail, however insignificant, escaped his watchful supervision and control.

He received his knighthood on the completion of the bridge in 1890, and never was this honour bestowed on one who had more worthily earned it; he had revolutionised the art of bridge-building and made it a science. The Tay Bridge, the Tower Bridge, and many other great structures will bear testimony to the fact that Sir William Arrol was, as a mechanical engineer, fully entitled to a place in that little band of men whose achievements in the field of engineering shed lustre over the last half of the nineteenth century.

NOTES.

BAD news is to hand from the Australian Antarctic expedition, under the leadership of Dr. Mawson, for two members of it have lost their lives. These are Lieut. Ninnis, an Englishman, and Dr. Mertz, a Swiss member of the scientific staff. The manner of their death is not stated, and, indeed, the whole message, which has reached Australia from the wireless telegraphic station established by the expedition at Macquarie Island, leaves us anxious for further information. It may be recalled that the expedition, reaching the Antarctic region in February of last year, was divided into two parties, under Dr. Mawson and Mr. Wild respectively, which landed about 143° E. and 95° E., in Adelie Land and Kaiser Wilhelm Land. It is known that valuable scientific work has been done, and that a considerable extent of coast-line has been charted for the first time. The vessel of the expedition, the *Aurora*, returned to Australia after landing the parties, and made a second voyage to the south to bring them off. It was thought that Dr. Mawson was aboard her, but apparently he missed her, owing to "unfortunate circumstances," which are not specified, and will have to remain in the south for another year, with six of his staff. For the rest, after mentioning the unhappy loss above referred to, he merely adds that there has been a successful sledging season, "opening up a large area of new land, both east and west of Commonwealth Bay, and obtaining important data at a number of stations in close proximity to the magnetic pole." But in view of what has befallen, anxiety must remain for many months as to the welfare of this party.

IT is officially announced that in recognition of the Antarctic work of her husband, the King has been pleased to grant to Mrs. Kathleen Scott the same rank, style, and precedence as if Capt. Scott had been nominated a Knight Commander of the Bath, as he would have been had he survived.

AN interesting exhibition of works by the late Mr. Thomas Woolner, R.A., is open at his studios, 29 Welbeck Street, W., until March 8. The exhibits include a number of objects of interest to men of science, among them being plaster busts of Charles Darwin, Huxley, and Richard Quain, bronze medallions of Darwin and Sir Joseph Hooker, a colossal head, in plaster, of Capt. Cook, and a bronze medal representing science and research. Any works not disposed of during the exhibition will be sold in the studio by auction, on a date to be announced later.

WE learn from *The Lancet* that, on the suggestion of the High Commissioner for Cyprus, the Secretary of State for the Colonies has arranged that a visit shall be paid to the island, during March, by Sir Ronald Ross, K.C.B., F.R.S.. The object of the visit is to investigate the causes of the prevalence of malarial fever in the island, and to advise in regard to the best means of combating the disease.

THE President of the Board of Agriculture and Fisheries has appointed Mr. D. H. Lane and Mr. Stephen Reynolds to be members of the Departmental

Committee which he has recently appointed to inquire into the present condition of the inshore fisheries, and to advise the Board as to the steps which could with advantage be taken for their preservation and development. The President has also appointed Dr. E. H. J. Schuster to be a member of the advisory committee recently constituted to advise the Board on questions relating to the elucidation through scientific research of problems affecting fisheries.

ON Wednesday, March 12, a special meeting of the Faraday Society will be held in the rooms of the Chemical Society, Burlington House, when the programme will consist of a general discussion on the subject of "Colloids and their Viscosity." The chair will be taken by the president, Dr. R. T. Glazebrook, C.B., F.R.S., and papers will be read by Dr. Wolfgang Ostwald, Drs. H. Freundlich and N. Tshzake, Dr. W. Pauli, Dr. V. Henri, Mr. E. Hatschek, Prof. F. G. Donnan, F.R.S., Dr. S. B. Schryver, Prof. W. M. Bayliss, F.R.S., and Mr. W. B. Hardy, F.R.S.

AT the annual general meeting of the Physical Society, held on February 14, the officers for the ensuing year were elected as follows:—*President:* Prof. A. Schuster, F.R.S. *Vice-Presidents:* Those who have filled the office of president, together with Mr. F. E. Smith, Prof. C. H. Lees, F.R.S., Prof. T. Mather, F.R.S., Dr. A. Russell. *Secretaries:* Mr. W. R. Cooper, Dr. S. W. J. Smith. *Foreign Secretary:* Prof. S. P. Thompson, F.R.S. *Treasurer:* Mr. W. Duddell, F.R.S. *Librarian:* Dr. S. W. J. Smith. *Other Members of Council:* Prof. C. G. Barkla, F.R.S., Prof. P. V. Bevan, Dr. W. H. Eccles Prof. J. W. Nicholson, Major W. A. J. O'Meara, C.M.G., Prof. T. C. Porter, the Hon. R. J. Strutt, F.R.S., Dr. W. E. Sumpner, Mr. R. S. Whipple, Dr. R. S. Willows.

AT the anniversary meeting of the Geological Society, held on February 21, the officers for the ensuing year were appointed as follows:—*President:* Dr. A. Strahan, F.R.S. *Vice-Presidents:* Prof. E. J. Garwood, Mr. R. D. Oldham, F.R.S., Mr. Clement Reid, F.R.S., and Prof. W. W. Watts, F.R.S. *Secretaries:* Dr. A. Smith Woodward, F.R.S., and Mr. H. H. Thomas. *Foreign Secretary:* Sir Archibald Geikie, K.C.B., President R.S. *Treasurer:* Mr. Bedford McNeill. The following awards of medals and funds were made:—Wollaston medal, Rev. Osmond Fisher; Murchison medal, Mr. George Barrow; Lyell medal, Mr. S. S. Buckman; Bigsby medal, Sir Thomas Henry Holland, K.C.I.E., F.R.S.; Wollaston fund, Mr. W. W. King; Murchison fund, Mr. R. E. L. Dixon; Lyell fund, Mr. Ll. Treacher; Barlow-Jameson fund, Mr. J. B. Scrivenor and Mr. Bernard Smith. The president delivered his anniversary address, which dealt with the form of that part of the Palæozoic platform which underlies the secondary rocks of the south-east of England.

THE meetings of the Institution of Naval Architects will be held on March 12–14 inclusive, in the hall of the Royal Society of Arts. The morning meetings begin at 11.30, and the evening meetings on March 13 and 14 at 7.30. On March 12 the election of officers will take place, the president's address will be delivered, and the institution gold medal and premiums presented. Papers will be read and discussed on each of the three days of the meetings, and among the subjects to be considered the following may be mentioned:—The mechanical gearing for the propulsion of ships, by the Hon. Sir Charles A. Parsons, K.C.B.; the energy systems accompanying the motion of bodies through air and water, by Prof. J. B. Henderson; the calculation of stability in non-intact conditions, by Prof. W. S. Abell; notes on modern airship construction, by Baron A. Roenne; and the longitudinal stability of skimmers and hydro-aeroplanes, by Mr. J. E. Steele. The annual dinner will be held on March 12, at 7.30 p.m., in the Grand Hall of the Connaught Rooms.

IN connection with the paragraph which recently appeared in our columns on the Pennant collection presented to the Natural History Museum by Lord and Lady Denbigh, it may be mentioned that, according to a notice in *The Times,* the birds include two very interesting specimens of the capercaillie. These, it is inferred, probably represent the old British stock, which became extinct about 1760 in Scotland, and, if so, are its only known representatives. Further examination may prove the right of the British bird to rank as a distinct race. The capercaillies now found in certain parts of Scotland are the descendants of Scandinavian birds introduced about 1837 by the then Marquis of Breadalbane, at Taymouth Castle. In a notice of the collection in *The Pall Mall Gazette* of February 19 it is stated that Mr. Edgar Smith has found that a British snail described by Pennant as *Helix rufescens* turns out to be a young specimen of *H. arbustorum.* For the British species which has hitherto been incorrectly identified with *H. rufescens* the name *H. montana* is available.

THE Board of Trade announces with regard to the forthcoming expedition of the *Scotia* (see p. 680), which is being organised jointly by the Board of Trade and the North Atlantic steamship lines for the purpose of ice observation in the North Atlantic, that one member of the staff will be a trained meteorologist. Dr. Assmann, director of the Royal Prussian Aëronautical Observatory at Lindenberg, has made a valuable contribution to the scientific equipment of the *Scotia* by providing a number of kites for meteorological work, and instruments to be attached to these kites for recording air pressure, temperature, relative humidity and wind velocity. It is hoped that if the weather conditions on the voyage are favourable a considerable addition may be made to the present very meagre knowledge as to the conditions of the currents in the upper air in the regions off the east coast of Newfoundland and Labrador. The long-range wireless apparatus in the vessel is being provided free of charge by the Marconi Company. Two wireless operators will be employed in order that a constant watch may be kept.

THE keen north-easterly wind which blew with such persistence over the British Isles for the eight days from February 15 to February 22 has checked somewhat the early and rapid development of vegetation, and in this way it will have proved beneficial. The cold over the United Kingdom was, however, by no means great, and the maximum day temperature at Greenwich was only below 40° on two days, February 18 and 20, although in the ten days from February 13 to February 22 there was only one day, February 16, with the shade temperature above 43°. The frost at night was generally slight, but on the early morning of February 23, when the north-east wind had practically ceased, the shade temperature at Greenwich fell to 24°, which is the lowest reading since February 6, 1912, and the exposed thermometer on the grass fell to 10°. The weather was generally very dry. The controlling factors were a region of high barometer, mostly to the north of Scotland, and areas of low barometer to the south of Europe. On the Continent, and especially in France and Germany, the weather for the period was much colder than in the United Kingdom. Snow fell at Nice on February 17 and 19, and on February 17 the maximum day temperature at Nice was 41°, whilst at Greenwich for the same day the maximum was 42°.

AT the annual general meeting of the Royal Astronomical Society on February 14, Dr. F. W. Dyson, the president, gave an address on the presentation of the gold medal which had been awarded to M. Henri Alexandre Deslandres, for his investigations of solar phenomena and other spectroscopic work. He pointed out that M. Deslandre's labours in solar physics have extended over more than twenty-one years. His researches on banded spectra established the laws followed by all spectra of this class; he also investigated the spectrum of the corona and of comets and their tails. But his most important work was with the spectroheliograph and a velocity recorder devised by himself, with which, perhaps, even more important results are being obtained. The chief general conclusion drawn from the velocity records is that the bright areas on the solar surface are descending and the dark filaments ascending. He has always kept in mind the ultimate object of his researches—the determination of the constitution and circulation of the solar atmosphere. The gold medal was handed to M. Roux, secretary of the French Embassy, for transmission to M. Deslandres, who was unable to be present. The president also announced that the Jackson-Gwilt bronze medal and gift had been awarded to the Rev. T. H. E. C. Espin, for his observations of the spectra of stars and his discovery of Nova Lacertæ. After a brief account of these researches, the president handed the medal and gift to Mr. Espin.

NEWS has reached us, by cablegram from Calcutta, of the death, on February 19, of Prof. W. Tate, professor of chemistry in the Civil Engineering College, Sibpur. Prof. Tate received his early scientific education at the Midland Institute, Birmingham, whence he proceeded, in 1886, to the Royal College of Science, South Kensington, as a national scholar. After a brilliant career as a student, he obtained the associateship of the college in chemistry, with honours, in 1889. He was then appointed demonstrator in one of the chemical laboratories of the college, and during that period he was engaged in some researches, and prepared a revised and enlarged edition of Sir Edward Thorpe's "Chemical Problems." About sixteen years ago Prof. Tate was appointed to the Indian Educational Service as professor of chemistry at the Civil Engineering College at Sibpur, which is situated in rather an unhealthy and somewhat malarious locality five or six miles to the south of Calcutta, on the banks of the Hooghly; and he continued in this appointment up to the time of his death. He had to reorganise, and almost to create, the chemical department of that college. Under his supervision a very successful and commodious laboratory was erected and equipped, and excellent work has been done in it by the students under his tuition. He also gave great help to committees of the Calcutta University in determining the courses in science for its degrees in civil engineering and also in other University questions. He did valuable work during the whole of his service in India, and was very popular with the members of his department, and also with his students. His death at a comparatively early age will be deeply regretted by many friends, both in India and at home.

THE exhibition of "Wonders of Science," held in the Surbiton Assembly Rooms on February 19–22, proved remarkably successful, the capacity of the hall being frequently inadequate to accommodate all seeking admission. It is estimated that more than 7000 persons attended during the hours for which the exhibition was officially open; in addition, about 1200 school children were admitted in the mornings. The official programme mentions 152 exhibits, but many of these consisted of numerous objects. They included scientific apparatus, instruments, records, and specimens, illustrating the progress of science, particularly in physics, electricity, chemistry, botany, astronomy, and medicine. In many instances instruments were shown in actual working. Demonstrations were given, from time to time, on liquid air, wireless telegraphy and telephony (including the transmission of music), the culture of bacteria, science applied to music, glass-blowing, the use of the potter's wheel, the Fleuss life-saving apparatus, &c. A party of boys who had made themselves experts in blowing soap-bubbles was always the centre of a group of interested spectators, whilst the fascination of motion drew others to the gyroscope tops, rainbow cups, mercury heart, vortex rings, and the paper circular saw which was cutting wood. Microscopic objects shown under about forty microscopes had a constant succession of interested observers. The electric light produced by induction, as shown by Mr. Sharman, attracted great attention, as did also the Röntgen rays, the radium exhibit, the Pathéscope, and the optophone, an instrument by which light rays produce audible vibrations. The great success of the exhibition may be attributed to (1) the generosity of many prominent men of science in lending exhibits and assisting in other ways; (2) the energy and zeal of a large party of local workers aided by friends from a distance, under the leadership and direction of the president, the Rev. J. C. Harris; (3) the satisfactory efforts of the publicity and tickets committees to advertise the exhibition beforehand in the district.

Lord Carnarvon and Mr. C. L. Woolley have recently been excavating Beacon Hill, in Hampshire, and the results are communicated by the latter to the January issue of *Man.* The fine contour-fort supplied examples of two types of construction, large circles, possibly pens surrounded by wattle enclosures, and hut dwellings sunk down to the chalk. The former contained a fragment of black pottery of the Bronze age. A mile or so from Beacon Hill is the group of tumuli known as the "Seven Barrows." In one of these, which had not previously been disturbed, were found several burnt flints, which in the absence of human bones suggest disposal of the dead by cremation, as was usual in southern England. The form of the barrow is its most interesting feature, the open stone ring recalling the external structure of the long barrows, and suggesting that this constitutes an intermediate link between the long and round types of barrow.

To the January number of the New York Zoological Society's Bulletin Prof. H. F. Osborn communicates an illustrated account of the remarkably fine series of wild horses, asses, and zebras at present living in the menagerie, where a new house has recently been built for their reception. The paper is accompanied by a couple of maps showing the distribution of the various species and races.

According to an article by Mr. E. R. Waite in the fourth number of Records of the Canterbury (N.Z.) Museum, that institution has acquired, at a cost of 400*l.*, the skeleton of a Sibbald's rorqual, prepared from an individual stranded near Okarito, on the west coast of the south island. In the flesh this monster measured 87 ft. in length. The museum has also added to its collection a cast and the skeleton of a stranded specimen of Layard's beaked whale.

We have received from Mr. J. A. Hutton, of Woodlands, Alderley Edge, a table showing the annual number of salmon taken in the Wye from 1905 to 1912, with nets and with rods, and also the number of tons of "fish" taken, year by year, from 1890 to 1912. In the first table the "record" occurred in 1912, when the total number of salmon was 6205, with a collective weight of 91,068½ lb., while in the second the maximum catch, by Miller's netting, was 60¼ tons.

In the February issue of *British Birds,* the editor records that a swallow ringed in Staffordshire in May, 1911, was taken near Utrecht, Natal, on December 23, 1912. After commenting on the length of the journey made by this bird, Mr. Witherby expresses the opinion that the evidence at present available does not support the view that British swallows normally travel southwards by the East African route, as might be inferred to be the case from the new record.

Some months ago we recorded the arrival at Mr. Carl Hagenbeck's establishment of five specimens of the pigmy West African hippopotamus, these, which were sold to Berlin and New York, being the first living examples of their kind to reach Europe. As announced in *The Times* of February 7, an immature living specimen has been received at the Zoological Gardens in Regent's Park. A descriptive illustrated account of the animal, which has been conditionally purchased by the society, is given by Mr. Pocock in *The Field* of February 15.

That the mysterious humming in the air heard at times in fine summer weather in this country is due (as recorded in Nature in November last) to chironomid flies, is fully endorsed in a note communicated to the February number of *The Entomologist's Monthly Magazine* by Dr. E. E. Green. Writing from Ceylon, Dr. Green states that when bicycling by the border of a lake he heard a loud noise, which he had first attributed to machinery in motion, but that soon after he ran into a dense fog of minute flies, from which the sound proceeds. These flies, which sometimes swarm into the houses of the residents in such numbers that they may be swept up in the morning by the bushel, are, it seems, a species of Chironomus. Dr. Green also endorses the opinion that the sound is produced by a true stridulating action.

Prof. A. H. Trow has during the last six years made a study of the inheritance of certain characters in the common groundsel (*Senecio vulgaris*), and has published some of his results in *The Journal of Genetics,* vol. ii., No. 3. He finds that this is an aggregate species which includes many segregate or elementary species, of which he has cultivated twelve; these were maintained pure and true to type for at least several generations. Six of them have been studied in detail, and are distinguished by more or less descriptive names; the others are for the present simply designated with their place of origin, all except one being British. The investigation has included the critical examination of about 10,000 groundsel plants; the most exacting work, consisting of long and tedious series of measurements of the vegetative organs, will form the basis of a further paper by the author.

Under the title, "World Weather Bureau Favoured," *The Pittsburg Post* (Pa.) of January 27 contains the report of a statement by Mr. H. H. Clayton, for many years meteorologist at the late Prof. Rotch's observatory at Blue Hill (Mass.), with reference to the importance of the establishment of a central international weather bureau, where the accumulating observations from all parts of the world could be discussed. The idea of such an institution was mooted many years ago, and Mr. Clayton thinks its want is growing greater; he remarks: "It is ever becoming more apparent that if we are to leap the bounds of day-to-day forecasts for the seasons we must collect observations and study the meteorology of the world as a whole." And with reference to crops and their connection with droughts and rainfall he points out that fabulous sums are at stake. Bearing upon the latter subject we may also refer to an interesting lecture, "Meteorology and Agriculture," especially the section on the possibilities of the use of statistics, delivered by Dr. W. N. Shaw at Cambridge, and printed in the Journal of the Scottish Meteorological Society (vol. xvi., No. xxix.) Mr. Clayton pays a well-merited tribute to the "splendid pioneer work" of Rotch, Teisserenc de Bort, Hildebrandsson, and of Sir Norman and Dr. Lockyer, but he points out that an organisation on a very large scale is required, employing meteorologists from all over the world, cooperating with all Government institutions, yet having an individual existence and a permanent endowment.

IN his second Cantor lecture before the Royal Society of Arts, on the methods of economising heat, Mr. C. R. Darling referred to the great saving which might be effected if engineers would devote more attention to the physical laws and methods of heat insulation. Data are now available which enable the heat losses in the case of furnaces, and the heat gains in the case of refrigerating plant, to be reduced materially. The two problems must be kept distinct, as the materials which may be best at one temperature are seldom the best at another temperature, owing to the great change of heat-insulating properties of substances with temperature.

THE National Electric Lamp Association of Cleveland, Ohio, has just published No. 1 of an Abstract Bulletin which contains abstracts of all the scientific papers issued from the physical laboratory of the association from its inception in 1908 to the present time. The full papers are already available in the proceedings of scientific societies or in the technical Press, but the abstracts of twenty-eight papers which the present number of the bulletin contains will be of great use to those who require the results of the investigations without the experimental details. We have had occasion to refer to some of these results, and we only propose here to direct attention to the wide ground covered by the abstracts, which are all prepared by the authors themselves. Several of them deal with the selective radiation from incandescent metals, many with photometry of lights of the same or different colours, a number with the efficiencies of lamps, and several with visual acuity. The association is to be congratulated on the scientific value of the work which is turned out from its physical laboratory.

NOTICES have recently appeared in the daily Press and *The Scientific American* regarding an invention by M. Moreau, of Paris, which, according to the accounts, is claimed to be a solution of the problem of automatic stability for aeroplanes. The main feature would appear to be that the aviator sits in a kind of swing, described as a pendulum seat, operating on the rudder for vertical steering, although it is stated that the seat can also be fixed by means of a brake. This arrangement may facilitate personal control, and in this respect, experience may prove it to be successful, but it can scarcely be likely to secure "stability." Suspension of the aviator's seat is statically equivalent to raising the centre of gravity of the system, while, on the other hand, any pendulum arrangement increases the number of possible oscillations and adds to the difficulty of satisfying the conditions of stability. So little has been done in applying the principles of rigid dyanmics to aeroplanes that any attempt of this kind must be regarded as highly doubtful from a theoretical point of view. At the present time even Newton's laws of motion are quite disregarded in many writings and experiments on aviation. The "ideal pendulum," which is supposed to maintain a fixed direction without oscillating, has no more existence than the perfectly smooth body of our text-books. Failing an efficient study of the dynamics of the problem, the safest course in experimenting with pendulums is to damp their oscillations as much as possible. Perhaps the aviator himself damps the oscillations, in which case this may be a practical and successful way out of the difficulties.

No. 1 of vol. v. of the Journal of the College of Agriculture, Tokyo, contains a number of exceptionally interesting papers. Prof. U. Suzuki and S. Matsunaga show that nicotinic acid occurs together with oryzenin in rice bran; this observation is of special interest, as, apparently, it is the first time that nicotinic acid has been observed in plant material, although a homologue, picolinecarboxylic acid was isolated by Schreiner and Shorey some years back from soils rich in humus. Mr. T. Yabuta has studied a new organic acid which is formed by the action of *Aspergillus oryzae* on steamed rice in the manufacture of "koji," and to which the name "koji-acid" is given; it is not identical with any acid yet obtained from the lower fungi, and is apparently also formed by some other Aspergillus species, but not by Penicillium or Mucor. There is an interesting paper by Mr. S. Muramatsu on the preparation of "natto," a vegetable cheese obtained by fermenting boiled soya beans, and the nature of the micro-organisms involved in the change, whilst Mr. R. Inouye contributes an important study of the chemical composition of the silkworm at different stages of its metamorphosis.

The Builder for February 21 refers to the announcement that Prof. Boni has found that three large lifts were in operation at the Imperial Palace on the Palatine Hill in ancient Rome. Modern refinements of mechanism and finish were lacking, but the fact that machinery of this kind was employed affords additional evidence of the engineering genius of the Romans. Roman houses were heated in the first century by means of hot air proceeding from furnace-rooms and circulating under floors and inside the walls. Excavations in Pompeii have brought to light a house with well-designed hot and cold water service on a plan closely resembling modern installations. Instances such as these emphasise the point that modern achievements depend upon improved appliances and increased scientific knowledge rather than upon superior intellectual capacity.

MR. J. D. POTTER has published separately, at the price of 2*s*. 6*d*. net, the "New Log and Versine Altitude Tables," from "The 'Newest' Navigation Altitude and Azimuth Tables for Facilitating the Determination of Lines of Position and Geographical Position at Sea," by Lieut. R. de Aquino, the second edition of which was reviewed in NATURE for February 6 last (vol. xc., p. 617).

THE proceedings at the conference on the theory of radiation, held in Brussels in 1911, have been referred to in two articles in NATURE. The first appeared on November 16, 1911 (vol. lxxxviii., p. 82), and the second on January 16, 1913 (vol. xc., p. 545). We have now received a copy of a volume containing the papers read at the conference and reports of the discussions upon them; it is printed in French, edited by MM. P. Langevin and M. de Broglie, and published by M. Gauthier-Villars, of Paris, at the price of 15 francs.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR MARCH :—

March 2. 0h. 24m. Jupiter in conjunction with the Moon (Jupiter 5° 22′ N.).
3. 22h. 50m. Uranus in conjunction with the Moon (Uranus 4° 2′ N.).
4. 8h. 30m. Mars in conjunction with the Moon (Mars 3° 19′ N.).
9. 2h. 53m. Mercury in conjunction with the Moon (Mercury 1° 29′ N.).
11. 8h. 30m. Venus in conjunction with the Moon (Venus 2° 1′ N.).
13. 12h. 36m. Saturn in conjunction with the Moon (Saturn 6° 23′ S.).
17. 8h. 43m. Neptune in conjunction with the Moon (Neptune 5° 34′ S.).
19. 3h. 0m. Venus at greatest brilliancy.
20. 17h. 18m. Sun enters Sign of Aries, Spring commences.
21. 23h. 58m. Moon eclipsed, invisible at Greenwich.
29. 14h. 29m. Jupiter in conjunction with the Moon (Jupiter 5° 19′ N.).

THE SOLAR ACTIVITY.—A sun-spot of unusually high latitude is at present visible on the solar disc. First seen on February 19, when it had just come over the eastern limb in heliographic latitude about 35° N., the spot has since developed somewhat, and on Monday last the leading nucleus was fairly large and dense. An outbreak in such a high latitude possibly marks the beginning of a new sun-spot cycle, for the new cycles generally commence at a great distance from the equator, while the old cycle is dying away near the equator.

As pointed out in Monday's *Times*, the epoch of the next maximum of spot activity is somewhat uncertain because the previous maximum, 1906, was late, and presented a double peak.

PHOTOGRAPHIC MAGNITUDES OF STARS IN COMA BERENICES.—On five plates taken with a 4-in. anastigmat portrait lens, Herr Hnatek has measured the extra-focal images of 104 stars in the asterism Coma Berenices, and publishes the results in No. 4629 of the *Astronomische Nachrichten*. In addition to the definitive mean magnitudes, ranging from 5·2 to 10·3. Herr Hnatek gives the magnitudes as determined from each of his five plates, the B.D. number, the spectral type (Harvard), and the differences between his own and five other measures by various observers; these comparisons show differences varying with magnitude and spectral type. For example, it is seen that the difference of magnitude Hnatek-Pickering increases as the temperatures decrease, and amounts to 0·43 mag. for class K stars.

THE DISTRIBUTION OF SPECTROSCOPIC BINARY STARS.—From Prof. Stroobant we have received an abstract from the *Comptes rendus* (vol. clvi., p. 37), in which he has discussed the distribution of spectroscopic binaries, as compared with other stars, in the celestial sphere. Dividing the sphere into 20° zones of galactic latitude, he finds that of the 306 stars given in Campbell's second catalogue of spectroscopic binaries, 217 lie within the zone +30° to −30° galactic latitude, and only eighty-nine without it. For naked-eye stars generally, the proportion is 3154 to 2565, according to Houzeau.

This preponderance near the Milky Way is found to be due to the relatively large number of helium stars among the binaries, about 35 per cent. of the total, for, according to Pickering, 93 per cent. of 686 helium stars are to be found in the galactic zone.

HIGH-LEVEL MEASUREMENT OF SOLAR RADIATION.—In No. 1, vol. xxxvii., of *The Astrophysical Journal* Prof. Very discusses the conditions affecting the measures of solar radiation at high levels. Taking measures made up to nearly 30 km., he shows that aqueous vapour, the chief atmospheric absorbent of solar radiations, is still present, in appreciable quantities, at these great altitudes; thus the limits of the aqueous atmosphere are extended much further than some meteorologists have thought to be possible. Having reduced observations made at sea-level, 4420 and 13,700 metres, he finds thermal equivalents, at these heights, of 1·5, 2·00, and 2·86 cal./sq. cm. min. respectively, and by plotting these results gets a value for the solar constant of radiation of 3·5 cal./sq. cm. min.

THE BLEACHING OF FLOUR.[1]

EARLIER reports to the Local Government Board on the chemical changes produced in flour by bleaching, which have been summarised already in these columns, have been written with the object of producing chemical evidence of the supposed injurious effect of bleaching. A recent legal decision of considerable moment has stated that the presence of 3·43 parts of nitrites per million does not alter the genuineness of flour, and that it is admitted that no injurious effects from such a quantity of nitrites can be proved. The result of commercial bleaching is merely to alter the colour of flour to suit the taste of the consumer without altering the nature, substance, and quality of the flour so as to render it a different article.

In the present report, Dr. Monier-Williams admits evidence which brings his views more into line with those prevailing elsewhere.

Following the suggestion of Wesener and Teller, the colouring matter of flour has been compared by him with carrotene, the yellow plastid colouring matter of plants which is so obvious in the carrot. The method of comparison adopted is a physical one, namely the examination of the absorption spectra of the two pigments, which are shown to be identical. The colouring matter of flour is thus established as carrotene.

Pure carrotene crystallises in small leaflets of an intense red colour, which, on exposure to the air, gradually absorb oxygen and form a colourless compound. Carrotene also absorbs practically its own weight of nitrogen peroxide, forming colourless compounds of unknown nature, which, however, all give

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[1] Report to the Local Government Board by Dr. G. W. Monier-Williams. Food Reports, No. 19. October, 1912. Price 3*d*.